

II. AMENDMENTS TO THE DRAWINGS:

FIG. 4 (drawing page 4/6) has been changed to comport with the specification and to comply with the request of the Office. It should be noted, that for the sake of clarity, FIG. 4 shows only $\frac{1}{2}$ of the structure shown in FIG. 3. By this amendment to FIG. 4, the structure of the fluid passage to the surface has been clarified. No new matter has been added.

FIG. 6 (drawing page 6/6) has been changed to comport with the specification and to comply with the request of the Office. Specifically, the structure of the fluid passage to the surface has been clarified. As shown, planar fluid jet 102 forces the fluid against surface 94 and into central cavity 112. Accordingly, the fluid flows into central vortex 120 and side vortex 124. No new matter has been added.

IV. REMARKS

Claims 1-20 are pending in this application. By this response, claims 1 and 10 have been amended. Applicants do not acquiesce in the correctness of the rejections and reserves the right to present specific arguments regarding any rejected claims not specifically addressed. Further, Applicants reserve the right to pursue the full scope of the subject matter of the original claims in a subsequent patent application that claims priority to the instant application. Reconsideration in view of the following remarks is respectfully requested.

In the Office Action, claim 4 is rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the enablement requirement. Claims 9-12 and 19 are rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1-3, 5, 6, 9-12, 14-17, and 20 are rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Lindstrom et al. (US 5,800,679), hereinafter “Lindstrom.” Claims 4, 7, 8, 13, 18, and 20 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Lindstrom.

A. REJECTION OF CLAIM 4 UNDER 35 U.S.C. §112, ¶ 1

The Office has rejected claim 4 for allegedly failing to comply with the enablement requirement. The Office asserts that the claim contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. *See* Office Action, p. 3. In response, Applicants submit, *inter alia*, that the Office has confused enablement with a perceived lack of efficiency. In the present invention, “[i]t is preferable that a vacuum flow velocity V_{vac} is

greater than the terminal velocity V_{dp} of a particle of interest with the largest diameter, i.e., $V_{vac} > V_{dp}$. Since cleaner 90 does not contact surface 94, some escaping fluid 126 (FIG. 4 only) can escape to a surrounding area 132 of cleaner 90 when fluid nozzle 110 delivery volume (Q_{jet}) is greater than vacuum 130 volume (Q_{vac}).” Specification, p. 6. Contrary to the Office’s assertion, the purpose of the claimed invention is not defeated if some of the fluid escapes from the cleaner. *See* Specification, p. 8. Furthermore, due to the vacuum effect created, some fluid, represented in FIG. 5 by Q_{room} , will be drawn into the vacuum through opening 132. Because cleaner 90 is positioned at a distance $h1$ from surface 94, it is clear to one skilled in the art that a portion of fluid may escape to surrounding area 132, while another portion of fluid enters the vacuum. *See* FIGS. 4-5. Therefore, Applicants submit, *inter alia*, that Q_{room} can be shown to flow into the cleaner without signifying a greater vacuum volume than fluid delivery volume, as asserted by the Office. *See* Office Action, p. 3. Accordingly, Applicants submit that the subject matter of claim 4 is described in the specification in such a way to enable one skilled in the art to make and/or use the invention. Therefore, Applicants request that the rejection be withdrawn.

B. REJECTION OF CLAIMS 9-12 and 19 UNDER 35 U.S.C. §112, ¶ 2

The Office asserts that claims are allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Reconsideration in view of the following remarks is requested.

With respect to claim 9, the Office asserts that “...the term ‘inner diameter of the fluid nozzle’ is not clear, as no reference points are set forth.” Office Action, p. 4. In response, Applicants submit that the term “inner diameter of the fluid nozzle” is clear because the fluid

nozzle diameter is inherently finite and definable. It is clear to one skilled in the art the appropriate reference points to quantify the diameter of a nozzle. The Office further asserts that “...the term, ‘a distance’, does not refer to any specific dimensions on the apparatus.” *Id.* In response, Applicants submit that the term “a distance” refers to a specific dimension spanning from a centerline of the fluid nozzle to each partition. As shown in FIG. 5, distance L1 from centerline (CL) of fluid nozzle 110 to each partition 108 is preferably greater than five times an inner diameter d_j of fluid nozzle 110, i.e., $L1 > 5.0d_j$. *See* Specification, p. 9. Therefore, it is clear as to which distance is being claimed. The Office still further asserts that “...the limitation, ‘inner diameter,’ in line 3 of claim 9 has insufficient antecedent basis.” Office Action, p. 4. In response, Applicants submit that the term “an inner diameter” provides sufficient antecedent basis. Accordingly, Applicants respectfully request withdrawal of the rejections with respect to claim 9.

With respect to claim 10, the Office asserts that “...the term, ‘vacuum entry,’ is not clear, as no reference points are set forth.” Office Action, p. 4. In response, Applicants submit that the term “vacuum entry” is broad but not indefinite. In addition, the Specification particularly points out vacuum entry 150 (Specification, p. 9), and FIG. 5 clearly sets forth vacuum entry reference point 150. The Office further asserts that “...claim 10, claims ‘a lateral distance’, not any specific dimensions on the apparatus.” Office Action, p. 4. In response, Applicants submit that the term “a lateral distance” refers to the lateral distance of each side cavity measured between a partition and a vacuum entry. As shown in FIG. 5, a ratio of a lateral distance L2 of each side cavity 122 between partition 108 and a vacuum entry 150 to partition distance h1 is preferably greater than 10, i.e., $L2/h1 > 10.0$. *See* Specification, p. 9. Claim 10 has been amended to clarify

the lateral distance being claimed. Accordingly, Applicants respectfully request withdrawal of the rejections with respect to claim 10.

With respect to claim 11, the Office asserts that “[i]n regards to claim 11, a partition defines the central cavity as stated in claim 1. Therefore, a central cavity consists of only one partition, which is inconsistent with the claim language.” Office Action, p. 4. In response, Applicants submit that claim 1 recites, *inter alia*, “...at least one partition[.]” Accordingly, Applicants submit that claim 11 reciting “each partition” is consistent with claim 1. Therefore, Applicants respectfully request withdrawal of the rejection with respect to claim 11.

With respect to claim 12, the Office asserts that “...the term ‘a vertical edge’ does not refer to any specific vertical edge and therefore it is unclear as to which vertical edge is being referenced.” Office Action, p. 4. In response, Applicants submit, *inter alia*, that the term “a vertical edge of the fluid nozzle” is definite because the reference is the fluid nozzle. In addition, the Specification particularly points out vertical edge 152 (Specification, p. 10), and FIG. 5 clearly sets forth vertical edge 152. Therefore, it is clear as to which vertical edge is being referenced. The Office further asserts that “...the limitation, ‘inner diameter,’ in line three of the claim has insufficient antecedent basis. Office Action, p. 4. However, claim 12 does not recite the term “inner diameter.” Accordingly, Applicants respectfully request withdrawal of the rejections with respect to claim 12.

With respect to claim 19, the Office asserts that it is “...not clear as to what is being removed, the particles suspended in the fluid or actually part of the vortex.” In response, Applicants submit that it is clear that the term “removing at least part of the second vortex” refers to actually removing part of the second vortex regardless of whether it includes particles or just

fluid. The term is broad, but not indefinite. Accordingly, Applicants respectfully request withdrawal of the rejection with respect to claim 19.

C. REJECTION OF CLAIMS 1-3, 5-6, 9-12, 14-17 and 20 UNDER 35 U.S.C. §102(b)

First, Applicants assume that claim 19 was intended to be included with the above listing of rejected claims, but was inadvertently omitted. Second, claim 20 is listed above, but is also listed and discussed in the Office Action with respect to the 35 U.S.C. §103(a) rejection. Accordingly, claim 20 will be discussed below in part D.

With respect to claim 1, Applicants submit that Lindstrom fails to disclose each and every feature of the claimed invention, including “wherein a main body of the first vortex and a main body of the second vortex are fluidly interconnected.” In support of its rejection, the Office asserts that “[e]ach partition defining a central cavity (25) configured to define the fluid into a first vortex and a side cavity (16) configured to define the fluid into a second vortex.” Office Action, p. 5. Interpreting Lindstrom only for purposes of this response, Applicants submit that Lindstrom’s side cavity, as defined by the Office as element 16, is not adjacent to central cavity 25. Referring to FIG. 1 of Lindstrom, it is clear that central cavity 25 and side cavity 16 are separated by exhaust air chamber 14. Because the vortices in Lindstrom are spatially separate with respect to one another, the main body of the first vortex and the main body of the second vortex are not fluidly interconnected. However, in the present invention, a side cavity 122 adjacent to central cavity 112 is configured to define fluid 126 escaping from central cavity 112 into a second or side vortex 124 (FIGS. 4 and 6), which interacts with central vortex 120. Each partition 108 and cavities 112, 122 are shaped to modulate the momentum exchange between

fluid 100 circulating in central cavity 112 and side cavity(ies) 122 to generate a pair of counter-rotating air vortices 120, 124 at each side of fluid jet 102. *See* Specification, p. 6. Lindstrom fails to disclose this feature. Accordingly, Applicants submit that Lindstrom fails to disclose each and every element of the claimed invention, including “wherein a main body of the first vortex and a main body of the second vortex are fluidly interconnected.” Claim 1. Therefore, Applicants respectfully request that the Office withdraw its rejection.

With further respect to independent claims 16 and 19, Applicants respectfully submit that Lindstrom fails to disclose, *inter alia*, “...at least one second vortex adjacent each first vortex and in contact with the surface.” Interpreting Lindstrom only for purposes of this response, Applicants submit that second vortex 16 is not in contact with surface W. *See* FIG. 1 of Lindstrom. Second vortex 16 is separated from surface W by exhaust air chamber 14. *Id.* In contrast, the claimed invention recites, at least one second vortex adjacent each first vortex and in contact with the surface. *See* claims 16 and 19. As shown in FIG. 4 of the present invention, second vortex 124 is in contact with surface 94. Lindstrom fails to disclose this claimed feature. Accordingly, Applicants request that the rejection be withdrawn.

With respect to dependent claim 17, Applicants submit that Lindstrom fails to disclose, *inter alia*, “wherein the first and second vortices are counter-rotating relative to one another.” As shown in FIG. 1 of Lindstrom, the vortices formed in vortex space 25 and vortex chamber 16 rotate in the same direction. The arrows in Lindstrom’s FIG. 1 clearly show both vortices rotating in a clock-wise direction. Accordingly, Applicants respectfully request withdrawal of the rejection.

With respect to dependent claims 2-3, 5-6, 9-12, and 14-15 Applicants herein incorporate the arguments presented above with respect to the independent claims from which the claims depend. The dependent claims are believed to be allowable based on the above arguments, as well as for their own additional features.

D. REJECTION OF CLAIMS 4, 7-8, 13, 18 and 20 UNDER 35 U.S.C. §103(a)

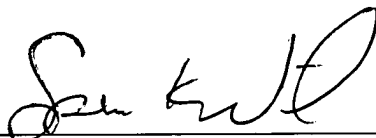
With respect to dependent claims 4, 7-8, 13, 18 and 20 Applicants herein incorporate the arguments presented above with respect to the independent claims from which the claims depend. The dependent claims are believed to be allowable based on the above arguments, as well as for their own additional features.

V. CONCLUSION

In light of the above, Applicants respectfully submit that all claims are in condition for allowance. Should the Examiner require anything further to place the application in better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the number listed below.

Respectfully submitted,

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